

9.—A REVISION OF SOME PREVIOUSLY DESCRIBED SPECIES OF BRYOZOA FROM THE UPPER PALAEOZOIC OF WESTERN AUSTRALIA.

By JOAN M. CROCKFORD, M.Sc.

Read 14th April, 1942: Published 24th March, 1944.

Communicated by PROFESSOR E. DE C. CLARKE.

CONTENTS.

	Page.
Introduction	187
Description of Species :—	
Genus <i>Fenestrellina</i> d'Orbigny.	
<i>Fenestrellina affluensa</i> (Bretnall)	188
<i>Fenestrellina horologia</i> (Bretnall)	189
Genus <i>Lyropora</i> Hall.	
<i>Lyropora erkosoides</i> (Etheridge)	191
Genus <i>Ramipora</i> Toulou.	
<i>Ramipora ambrosoides</i> (Bretnall)	193
Acknowledgments	195
Bibliography	195

INTRODUCTION.

Four species of Bryozoa, *Lyropora* (?) *erkosoides* Etheridge, *Fenestella affluensa* Bretnall, *Fenestella horologia* Bretnall, and *Aetomocladia ambrosoides* Bretnall, are here revised from the type material in the Western Australian Geological Survey Collection. In the original descriptions of these species the number of the holotype of each species is quoted, but in labelling the specimens the same number was used for all the specimens referred to the species, and in some cases the original labels are now missing; lectotypes are therefore chosen from the syntypes of the species revised, and the specimens have been recatalogued.

DESCRIPTION OF SPECIES.

Phylum BRYOZOA Ehrenberg.

Class GYMNOLAEMATA Allman.

Order CRYPTOSTOMATA Vine.

Family FENESTRELLINIDAE Bassler.

Genus FENESTRELLINA* d'Orbigny.

Fenestrellina d'Orbigny, 1849, Revue et Magasin de Zoologie, 2e Sér., Tome I., p. 501.

Homonym :—

Fenestella Lonsdale, 1839, preoccupied for a pelecypod, *Fenestella* Bolten, 1798.

Genotype : *Fenestella crassa* McCoy, 1845.

* An application for suspension of the Rules of Zoological Nomenclature for the generic name *Fenestella* Lonsdale 1839 has been submitted to the International Commission on Zoological Nomenclature by G. E. Condra and M. K. Elias (*Journal of Paleontology*, Vol. 15, no. 4, pp. 565-566).

Infundibuliform or flabellate Fenestrellinidae, with two rows of alternating zooecia on the branches, except before bifurcation, when the number of rows is increased; rows of zooecia separated by a median carina, plain or more frequently with a single row of nodes (aeanthopores); dissepiments not celluliferous; internal structure and reverse surface as for the family.

Fenestrellina affluensa (Bretnall).

(Plate I., fig. 6.)

Fenestella affluensa Bretnall, 1926, *W.A. Geol. Survey, Bull.* 88, p. 16, pl. I., fig. 8.

Fenestella affluensa Bretnall, Hosking, 1931, *Jour. Roy. Soc. W.A.*, Vol. XVII., p. 12.

Lectotype: Specimen 2/2405E, Western Australian Geological Survey Collection; on specimen figured by Bretnall, 1926, pl. III.

Horizon and locality: Between the top of the Lyons Series and the top of the Byro Series, Gascoyne River District, W.A.

Fenestrellina with three to four zooecia to a fenestrule; carina slight, rounded; nodes large.

The form of the colony is not shown; the lectotype is about 1.5 cm. long and 1.1 cm. wide. There are from 12 to 14 branches horizontally, and 8 fenestrules vertically, in 10 mm.; the branches are straight, normally from about 0.4 to 0.53 mm. in width, but rather narrower—about 0.35 mm.—where they are slightly weathered; on the celluliferous surface the carina is poorly developed, being represented only by a rounded area free from cells along the centre of each branch, separating the two rows of alternating cell apertures. Nodes are well developed, but are only shown where the surface is best preserved; they are very large and blunt, and are slightly elongated parallel to the length of the branch; their width at the top is up to 0.33 mm., and the distance between the centres of successive nodes is from 0.68 to 0.86 mm. The apertures are normally circular, about 0.14 mm., in diameter, but they may be much enlarged by weathering; they do not generally project into the fenestrules. Thin, raised peristomes are shown where the surface is well-preserved. The distance between the centres of successive apertures is from 0.29 to 0.37 mm., and about thirty occur in 10 mm. The fenestrules are oval—the dissepiments expand considerably at their junction with the branches—and are from 0.85 to 1.2 mm. in length and from 0.3 to 0.5 mm. wide; the width of the dissepiments is from 0.25 to 0.36 mm. Bifurcation occurs at rather distant intervals, and increase to three rows of zooecia occurs just before branching. The thickness of the branches is about 0.65 mm.

In specimens from the same locality, but not syntypes, the reverse surface shows a number of fine longitudinal striae where it is slightly weathered; the dissepiments are very nearly as thick as the branches, and both are evenly rounded.

Remarks: There are three specimens labelled "17" (the number given by Bretnall as that of the holotype) in the collection; of these the largest and best preserved is here chosen as the lectotype, and the measurements given in the above description were taken on it; there is a second, very small specimen on the same piece of shale, and a third, very much weathered specimen on a piece of limestone from the Callytharra Stage at Fossil Hill, Wyndham River. Both of these show fenestrules slightly longer than the average shown

by the lectotype, though they fall within the range of variation of it; they are weathered so that the nodes are not visible, but appear to be conspecific with the lectotype.

Fenestrellina affluensa is distinguished from associated species by its thick branches, and large, well spaced nodes.

***Fenestrellina horologia* (Bretnall).**

(Plate I., fig. 1; Plate II., fig. A.)

Fenestella horologia Bretnall, 1926, *W.A. Geol. Survey, Bull.* 88, p. 15, pl. I., fig. 6.

[non] *Fenestella horologia* Bretnall, Hosking, 1931, *Jour. Roy. Soc. W.A.*, Vol. XVII., p. 13, pl. IV., fig. 3.

Fenestrellina horologia (Bretnall), Crockford, 1944, *Jour. Roy. Soc. W.A.*, Vol. XXVIII., p. 167, pl. I., figs. 3, 6.

Fenestella parviuscula Bassler, 1929, *Paläontologie von Timor*, Lief. XVI., XXVIII., p. 76, pl. 17 (CCXLI.), figs. 8–13.

Fenestella parviuscula Bassler, Martin, 1931, *De Palacontologie en Stratigraphie van Nederlandsch Oost-Indie*, Bryozoa, p. 391.

Fenestella parviuscula Bassler, Fritz, 1932, *Roy. Soc. Canada, Transactions, Third Series*, Vol. XXVI., Sect. IV., p. 99.

Fenestrellina parviuscula (Bassler), Elias, 1937, *Jour. Paleontology*. Vol. 11, No. 4, p. 314.

Neotype (? Lectotype): Specimen 2/2405C, Western Australian Geological Survey Collection; on specimen figured by Bretnall, 1926, pl. III.

Horizon and locality: Between the top of the Lyons Series and the top of the Byro Series, Gaseoyne River District, W.A.

Fenestrellina with two zooecia to a fenestrule; carina low; nodes sharp, relatively high, about two to a fenestrule; fenestrules hour-glass shaped.

The form of the colony is not shown; there are about 18 branches horizontally, and from 16 to 18 fenestrules vertically, in 10 mm. The branches are straight, from 0.31 to 0.37 mm. in width, and show two rows of regularly alternating zooecial apertures, separated by a slight median carina. Bifurcation occurs at rather distant intervals, and increase to three rows of zooecia occurs just before branching. The apertures are circular, from 0.08 to 0.1 mm. in diameter, and are placed on the slightly sloping sides of the branches; the peristomes are not well shown. The apertures are generally very regularly placed, with one opposite the centre of each fenestrule and one at the end of each dissepiment; the former project into the fenestrules—though the apertures open upwards and not into the fenestrules—and give them their characteristic hour-glass shape. The distance between the centres of successive apertures is from 0.24 to 0.3 mm., and about thirty-seven occur in 10 mm. The nodes are small and sharp, and are placed in a single row on the carina; they are from 0.24 to 0.3 mm. apart. The fenestrules are from 0.32 to 0.51 mm. in length, and from 0.22 to 0.33 mm.—generally about 0.25 mm.—in width; the dissepiments are from 0.11 to 0.17 mm. in width. The reverse surface is not shown.

Remarks : *Fenestrellina horologia* was described by Bretnall from material from the Gascoyne River District ; the holotype was given as "Geological Survey of Western Australia (specimen 16)." Miss Hosking (1931, p. 13) stated that "the holotype of *F. horologia* (specimen 16 on 10930) is not to be found in the Geological Survey Collection" but (footnote) "A crumpled fragment of a *Fenestella* zoarium is labelled Holotype, but the distinguishing number and the greater part of the zoarium have been broken off." Specimens which she identified as *Fenestella horologia* from the Wooramel River District showed a double row of nodes on the carina ; she states that the specimen in the Geological Survey Collection was much the same as these, but was "too crumpled for accurate comparison," and does not say whether a single or a double row of nodes was shown.

There is at present no specimen in this collection labelled "16," and no specimen labelled "Holotype." The labels of many of the specimens have been wholly or partially destroyed, and there are two conspecific fragments of *Fenestrellina*, whose labels have been almost entirely removed, on a specimen of calcareous shale from the Gascoyne River District, figured by Bretnall on Plate III. (this specimen shows several more labels now than at the time it was photographed). Both of these show a slight carina between the two rows of apertures, and over the best preserved parts of the zoaria this carina shows a single row of small, high nodes ; both show very well the hour-glass shape of the fenestrules described by Bretnall ; it seems probable that these were the specimens used for the original description, and one of them is here chosen as the neotype (? lectotype). A single specimen of a second species showing only two zooecia to each fenestrule is present on the same piece of shale ; this specimen shows, very indistinctly, two rows of small nodes on the carina, and is probably the species identified as *Fenestella horologia* from the Wooramel River, described in a separate paper as *Minilya duplaris* gen. et sp. nov. (Crockford, 1944, p. 173) ; this, the only specimen of this species present in the collection, is very poorly preserved ; it does not show any projection of the zooecial apertures into the fenestrules, and the hour-glass shape of the fenestrules is not shown at all in this specimen, though it is shown in specimens from other localities ; it is not possible that Bretnall's description could refer to this specimen.

Fenestrellina horologia appears to be the same as *Fenestrellina parviuscula* (Bassler), from the Bitaoeni and Basleo Beds of Timor ; in the original description of *F. parviuscula* the width of the branches is given as "about 0.2 mm.", but the branches of the specimens figured appear to be about 0.3 mm. wide, as in the specimens from Western Australia. Elias (1937) has dealt with the relationships of this and similar species. *F. parviuscula* has been recorded from the Permian of Vancouver Island. The fenestrate part of *Lyropora erkosoides* (Etheridge) is very similar in size, but is differentiated by its more widely spaced nodes. *Fenestrellina pectinis* (Moore), which has been recorded by Chapman from the Callytharra Stage at Callytharra Springs, is similar in appearance, but is a smaller species with more closely spaced nodes.

Genus **LYROPORA** Hall.

Lyropora Hall, 1857, *Proc. Amer. Assoc. Adv. Sci.*, Vol. X., p. 179.

Lyropora Hall, Ulrich, 1890, *Geol. Surv. Illinois*, VIII., pt. II., Sect. IV., pp. 396, 580.

Lyropora Hall, Nickles, and Bassler, 1900, *U.S. Geol. Surv., Bull.* 173, pp. 39, 309.

Lyropora Hall, McNair, 1937, *Michigan University Museum of Paleontology Contributions*, Vol. V., No. 9, p. 114.

Genotype (selected by Ulrich, 1890): *Lyropora subquadrans* (Hall), 1857 (*L. lyra* (Hall), 1857).

Synonyms:—

Dictyoretmon Whitfield, 1904.

Lyroporella Simpson, 1895.

Lyroporina Simpson, 1897.

Zoarium fenestrate; colony flabelliform, with the sides near the base strongly thickened to form the lateral supports; branches with two or more rows of zooecia, dissepiments without zooecia; reverse surface and internal structure as in *Fenestrellina*.

***Lyropora erkosoides* (Etheridge).**

(Plate I., fig. 2; plate II., fig. B.)

Lyropora (?) *erkosoides* Etheridge, in Bretnall, 1926, *W.A. Geol. Survey, Bull.* 88, p. 11, pl. II., figs. 1, 4.

Leototype: Specimen 2/2404, Western Australian Geological Survey Collection; figured by Bretnall, 1926, pl. II., fig. 1.

Horizon and locality: Callytharra Stage (?), Well A 20, Daurie Creek, Gascoyne River District, Western Australia.

Lyropora with two rows of zooecia, and two zooecia to a fenestrule; carina slight; nodes sharp, high, evenly spaced.

The zoarium is flabellate; the base is small and pedunculate, and the sides of the colony above the base are strongly thickened, and form the lateral supports characteristic of the genus. These lateral supports diverge at an angle of about 70°, and the zoarium is celluliferous on the convex surface; the holotype reaches a height of 4 cm. above the base, and a width, at the top, of about 4 cm. There are about 22 branches horizontally, and 18 fenestrules vertically, in 10 mm. The branches are straight, and are usually from 0.22 to 0.29 mm. in width, but they become much broader towards the supports, and before bifurcation. There are two rows of zoecial apertures, separated by a very slight median carina on which there is a single row of high nodes, rather elongated along the carina at their bases. The nodes are placed from 0.3 to 0.37 mm. apart. The apertures are circular, about 0.09 mm. in diameter; slight peristomes are shown—these are best developed on the side towards the fenestrules. There are two apertures to a fenestrule, and over part of the specimen these are arranged so that one is opposite the end of each dissepiment, and one at the centre of each fenestrule, giving the fenestrules an hour-glass shape; over most of the specimen, however, the arrangement is not regular, and the fenestrules are oval in shape. The distance between the centres of successive apertures is from 0.24 to 0.32 mm., and about thirty-seven occur in 10 mm. The fenestrules are from 0.35 to 0.46 mm. in length, and from 0.17 to 0.29 mm.—generally about 0.2 mm.—in width; the width of the dissepiments is from 0.13 to 0.21 mm. On the reverse surface both branches and dissepiments are evenly rounded, and they are of about the same thickness—their thickness varies, however, with the distance from the lateral supports. The outer layer of the reverse surface is finely granular; within this a few fine longitudinal striae are shown. Bifurcation occurs at very distant intervals, and increase to three rows of zooecia occurs just before branching.

Remarks: There are two specimens labelled "13" (the number given by Bretnall for the holotype of this species) in the material described by Bretnall. The above description is of the figured specimen, here chosen as lectotype. A second specimen, from the Callytharra Stage at Fossil Hill, Wyndham River, does not appear to belong to the same species as the lectotype, from which it differs in the shape of the lateral supports; only a very small portion of the fenestrate part of the zoarium is preserved, along the sides of the lateral supports, and this is decidedly finer than the fenestrate part of the lectotype.

Etheridge referred this species tentatively to the genus *Lyropora* Hall, but, as the celluliferous surface of the specimen was not exposed, considered it possible that the species might belong to one of the genera proposed by Simpson for forms differing from the type of *Lyropora* in the number of rows of zooecia normally present on the branches. The type of *Lyropora*, *Lyropora subquadrans* (Hall) (*L. lyra* (Hall)), selected by Ulrich in 1890, shows from four to five rows of zooecia on the branches; *Lyroporida* Simpson, 1897, is a synonym of *Lyropora*, since it possesses the same genotype. *Lyroporella* Simpson, 1895, was proposed for forms with two rows of zooecia, the genotype being *Lyropora quincuneialis* (Hall); Nickles and Bassler (1900, p. 310), who considered that the only character of generic importance is the development of lateral supports, and McNair (1937, p. 114) consider *Lyroporella* a synonym of *Lyropora*.

Family **SULCORETEPORIDAE** Bassler.

Genus **RAMIPORA** Toula.

Ramipora Toula, 1875, *Neues Jahrbuch für Mineralogie*, 1875, p. 230, pl. X., figs. 1, 1a.

Ramipora Toula, Shulga-Nesterenko, 1933, *United Geological and Prospecting Service of the U.S.S.R.*, Trudi, Fasc. 259, pp. 32, 54.

Genotype: *Ramipora hochstetteri* Toula, 1875.

Synonym:—

Actomoeladia Bretnall, 1926.

Genotype: *Actomoeladia ambrosoides* Bretnall, 1926.

Zoarium pinnate, with the lateral branches joined by a third set of branches, which may themselves join to form a further set of branches; branches bifoliate, dividing in a plane at right angles to the mesial lamina; mesial lamina running from the centre of the obverse (poriferous) surface to the centre of the reverse (non-poriferous) surface, and projecting slightly above these surfaces so that both are ecarinate; zooecia sub-tubular, without hemisepta, arranged in more or less regular rows on each side of the carina of the poriferous surface, but not separated internally by vertical plates; lunaria absent or poorly developed; diaphragms extremely rare; acanthopores and mesopores absent; vesicular tissue well-developed internally, interapertural spaces solid at the surface.

Ramipora differs from *Goniocladia* Etheridge in the form of the colony, which is reticulate in *Goniocladia*. *Sulcoretopora* d'Orbigny (*Cystodietya* Ulrich) differs in its mode of branching (in the plane of the mesial lamina instead of at right angles to it), and in the form of the zoarium, and internally in the presence of vertical double plates between the rows of cells.

Bretnall (1926, p. 31) described *Aetomocladia* as a new genus "related to *Pinnatopora* Vine," the genotype being *Aetomocladia ambrosoides* Bretnall, from the Gascoyne River District, W.A., and Fossil Hill, Wyndham River, W.A. Bretnall did not study the internal structure of the genotype, and it has therefore been considered a member of the Acanthocladiidae. The internal structure, as is shown under the description of the species given below, is the same as that described by Bassler and Moore for species of *Goniocladia*, and by Shulga-Nesterenko for *Gonioeladia* and *Ramipora*, and indicates that *Aetomoeladia* is a member of the Sulcoreteporidae allied to these genera; the form of the colony separates *Aetomoeladia* from *Goniocladia*, and indicates identity with *Ramipora* (sens. str.).

***Ramipora ambrosoides* (Bretnall).**

(Plate I., figs. 3-5; plate, II., figs. C-F.)

Aetomocladia ambrosoides Bretnall, 1926, *W.A. Geol. Survey, Bull.* 88, p. 21, pl. I., fig. 4.

Aetomoeladia ambrosoides Bretnall, Hosking, 1931, *Jour. Roy. Soc. W.A.*, Vol. XVII., p. 12, pl. IV., figs. 5-6.

Aetomocladia ambrosoides Bretnall, Chapman, in Raggatt, *Jour. Roy. Soc. N.S.W.*, Vol. LXX., pp. 106, 128, 148.

Aetomocladia ambrosoides Bretnall, Raggatt and Fletcher, 1937, *Australian Museum Records*, Vol. XX., No. 2, p. 173.

Acanthocladia acuticostata Bassler, 1929, *Paläontologie von Timor*, Lief. XVI., XXVIII., p. 85, pl. 20 (CCXLIV.), fig. 13.

Lectotype: Specimen 2/2405B, Western Australian Geological Survey Collection; on specimen figured by Bretnall, 1926, pl. III.

Horizon and locality: Between the top of the Lyons Series and the top of the Byro Series, Gascoyne River District, W.A.

Fine *Ramipora*, with from three to five rows of zoecial apertures on each side of the mesial lamina.

Since the lectotype does not show the form of the colony very well, paratypes from the same locality, and from the Callytharra Stage at Fossil Hill, Wyndham River, and a number of specimens from the type locality of the Callytharra Stage in the Wooramel River District, and from the Nooneanbah Series in the Kimberley District have been used for this description; the measurements given, however, were taken only on the lectotype and other specimens on the same piece of shale.

The base of the zoarium is not shown on any of the specimens; the zoarium is pinnate; the branches are bifoliate, and division of the branches takes place in a plane at right angles to the mesial lamina. Lateral (secondary) branches are given off from the main stem, and themselves give off tertiary branches which usually pass straight from one secondary branch to another, but which rarely pass outwards obliquely and join to form a further set of branches. Subsidiary branches appear generally to originate at the same level on opposite sides of a branch, but actually one is nearly always given off very slightly before the other, as is shown by the junction of the mesial laminae of the lateral branches with that of the original branch; very rarely the lateral branches on opposite sides are more widely separated. The distance between the origins of two successive pairs of lateral branches is from

2.5 to 5.5 mm. in these specimens, and the angle at which the lateral branches are given off is from 50° to 77° —in specimens from the Nooncanbah Series this angle is up to 90° . The main stems are usually slightly broader and thicker than the lateral branches, their width being from 1.1 to 1.5 mm., and their thickness about 1.5 mm.; the width of the secondary branches is from 0.8 to 1.4 mm., and the tertiary branches are slightly narrower.

The branches are bifoliate, with a mesial lamina which runs from the centre of the reverse to the centre of the poriferous surface, and forms a slight ridge along the centre of each surface, so that both are carinate; the poriferous surface, however, is sharply convex, with the sides sloping steeply outwards, while the reverse surface is rather rounded. On each side of the carina on the poriferous surface there are three or four, less often five, rows of zooecial apertures; the arrangement of the apertures, however, is not always regular. The apertures are raised above the surface by the development of high peristomes, particularly on the lower side of the aperture; from sections it appears that no lunaria are developed; the peristomes are very quickly removed by weathering. When the apertures are arranged in definite rows the amount of alternation between the apertures of adjacent rows is very variable, and often very slight. The apertures are circular, or pyriform where they are weathered, and are from 0.14 to 0.18 mm. in diameter; they are rather irregularly spaced on all the branches, and the distance between the centres of successive apertures in the same row is from 0.38 to 0.76 mm. (average 0.56 mm.), and about eighteen apertures occur in 10 mm. No acanthopores are developed; the surface between the apertures is solid. The reverse (non-poriferous) surface is finely granular.

Internally the zooecia are sub-tubular, and the length of individual zooecia is about 1 mm. Diaphragms appear to have been very rarely developed near the proximal ends of the zooecia. The median tubules of the mesial lamina are well-shown, and vesicular tissue is well-developed, particularly near the reverse surface, and at the origin of subsidiary branches.

Remarks: In the original description of the species the "genotype" is given as "specimen 12," but there are seven specimens labelled "12" in the collection; these belong to three species, but one specimen, belonging to the species to which the original description most closely applies, is labelled "Genotype," and is here chosen as the lectotype of the species.

Of described species of *Ramipora*, the genotype, *R. hochstetteri* Toula, and a specimen recorded by Reed (1925, p. 107, pl. X., figs. 9, 9a), as *R. cf. hochstetteri* from India, most closely resemble this species; they differ, however, in their broader branches and larger measurements. *Ramipora uralica* Stuckenberg, from the Upper Carboniferous of the Urals, appears to have had lateral branches placed about the same distance apart, but the branches are much broader.

The type specimen of *Acanthocladia acuticostata* Bassler, from the Basleo beds of Timor, appears to be a specimen of this species.

A specimen described as *Ramipora* sp. by Etheridge (1907, p. 14) from the Port Keats Bore appears to have differed from this species in the form of the zoarium and in the much closer spacing of its lateral branches.

ACKNOWLEDGMENTS.

I wish to thank the Government Geologist of Western Australia for the loan of specimens from the Western Australian Geological Survey Collection and Miss Crespin for specimens from the Commonwealth Palaeontological Collection ; and Dr. I. A. Brown for the help which she has given me with the preparation of this paper. This work has been carried out during the tenure of a Science Research Scholarship at the University of Sydney.

BIBLIOGRAPHY.

1. Bassler, R. S., 1929 : The Permian Bryozoa of Timor, *Paläontologie von Timor*, XVI. Lieferung, XXVIII.
2. Bretnall, R. W., 1926 : Palaeontological Contributions to the Geology of Western Australia, Series VII., No. XIII., Descriptions of some Western Australian Fossil Polyzoa, *W.A. Geol. Survey, Bull.* 88.
3. Crockford, Joan M., 1944 : Bryozoa from the Wandagee and Nooncanbah Series (Permian) of Western Australia, Part I., *Jour. Roy. Soc. W.A.*, Vol. XVIII., pp. 165-185.
4. Elias, M. K., 1937 : Stratigraphic Significance of Some Late Paleozoic Fenestrate Bryozoans, *Jour. Paleontology*, Vol. 11, No. 4, pp. 306-334.
5. Etheridge, R., jnr., 1873 : Description of *Carinella*, a New Genus of Carboniferous Polyzoa, *Geol. Mag.*, Vol. X., pp. 433-434.
6. Etheridge, R., jnr., 1876 : Carboniferous and Post-Tertiary Polyzoa, *Geol. Mag.*, N. S., Dec. II., Vol. III., pp. 522-523.
7. Etheridge, R., jnr., 1907 : Official Contributions to the Palaeontology of South Australia, No. 19.—Fossils of the Port Keats Bore, Thirty Miles North of Fossil Head, Treachery Bay, *Supplement to Parliamentary Paper No.* 55 of 1906.
8. Fritz, Madeleine A., 1932 : Permian Bryozoa from Vancouver Island, *Roy. Soc. Canada, Transactions, Third Series*, Vol. XXVI., Sect. IV., pp. 93-110.
9. Hall, J., 1857 : Observations on the Genus Archimedes or Fenestella, *Proc. Amer. Assoc. Adv. Sci.*, Vol. X., pp. 176-180.
10. Hosking, Lucy F. V., 1931 : Fossils from the Wooramel District, Western Australia, *Jour. Roy. Soc. W.A.*, Vol. XVII., pp. 7-52.
11. Lonsdale, W., 1839 : In Murchison, Silurian System : John Murray, London, 1839.
12. McCoy, F., 1845 : Synopsis of the Carboniferous Limestone Fossils of Ireland : University Press, Dublin, 1845.
13. Martin, R., 1931 : De Palaeontologie en Stratigraphie van Nederlandsch Oost-Indie, Bryozoa, *Leidsche Geologische Mededeelingen*, Deel V., pp. 390-395.
14. Moore, R. C., 1929 : A Bryozoan Faunule from the Upper Graham Formation, Pennsylvanian, of North-Central Texas, *Jour. Palaeontology*, Vol. 3, No. 1, pp. 1-27.
15. Nickles, J. S., and Bassler, R. S., 1900 : A Synopsis of American Fossil Bryozoa, including Bibliography and Synonymy, *U.S. Geol. Survey, Bull.* 173.
16. Orbigny, A. d', 1849 : Sur Quelques Genres Nouveaux de Mollusques Bryozoaires, *Revue et Magasin de Zoologie, 2e Series*, Tome I., pp. 499-504.
17. Raggatt, H., 1936 : The Geology of the North-West Basin, Western Australia, with Special Reference to the Stratigraphy of the Permo-Carboniferous, *Jour. Roy. Soc. N.S.W.*, Vol. LXX., pp. 100-176.
18. Raggatt, H., and Fletcher, H. O., 1937 : A Contribution to the Permian-Upper Carboniferous Problem, and an analysis of the Fauna of the Upper Palaeozoic (Permian) of the North-West Basin, Western Australia, *Records of the Australian Museum*, Vol. XX., No. 2.
19. Reed, F. R. Cowper, 1925 : Upper Carboniferous Fossils from Chitral and the Pamirs, *Pal. Indica*, N. S., Vol. VI., Memoir No. 4.
20. Shnlgá-Nesterenko, M. J., 1933 : Bryozoa from the Coal-bearing and Subjacent Series of Pechora Land : Goniocladia Etheridge and Ramipora Toula, Carboniferous and Permian Representatives of the Family Cystodictyonidae, *Transactions of the United Geological and Prospecting Service of the U.S.S.R.*, Fasc. 259.
21. Simpson, G. B., 1895 : A Discussion of the Different Genera of the Fenestellidae, Thirtieth Annual Report of the State Geologist [of New York] for the year 1893, Albany, 1894 [1895], pp. 687-787. [Forty-seventh Annual Report of the New York State Museum of Natural History, Albany, 1894 [1895], pp. 881-921].

22. Simpson, G. B., 1897: A Handbook of the Genera of the North American Palaeozoic Bryozoa: with an introduction on the structure of living species, Fourteenth Annual Report of the State Geologist [of New York] for the year 1894, Albany, 1895 [1897], pp. 407-608. [*Forty-eighth Annual Report of the New York State Museum of Natural History, Albany, 1895 [1897], pp. 407-608.*]
23. Stuckenberg, A., 1895: Korallen und Bryozoen der Steinkohlenablagerungen des Ural und des Timan, *Mém. du Comité Géologique [Russia]*, Vol. X., No. 3.
24. Toula, F., 1875: Permo-Carbon-Fossilien von der Westkuste von Spitzbergen, Leonhard und Bronn's *Neues Jahrbuch für Mineralogie*, 1875, pp. 225-264.
25. Ulrich, E. O., 1890: Palaeozoic Bryozoa, *Geological and Natural History Survey of Illinois*, VIII., Pt. II., Sect. IV.
26. Whitfield, R. P., 1904: Notice of a New Genus and Species of Carboniferous Bryozoa, *Bull. American Museum of Natural History*, Vol. XX., p. 469.



PLATE I.

Figure 1. *Fenestrellina horologia* (Bretnall): Celluliferous surface of the neotype (? lectotype), x 10.

Figure 2. *Lyropora erkosoides* (Etheridge): Lectotype, natural size.

Figure 3. *Ramipora ambrosoides* (Bretnall): Reverse surface (Specimen 118, Commonwealth Palaeontological Collection) from the Callytharra Stage, west of Callytharra Springs, Wooramel River), x 5.

Figure 4. *Ramipora ambrosoides* (Bretnall): Celluliferous surface of the lectotype, x 5.

Figure 5. *Ramipora ambrosoides* (Bretnall): Celluliferous surface (Specimen 2793 e, University of Western Australia Collection, from the Nooncanbah Series 6½ miles north of Mt. Anderson, West Kimberley District), x 5.

Figure 6. *Fenestrellina affluensa* (Bretnall): Celluliferous surface of the lectotype, x 10.

(Photographs by H. G. Gooch.)

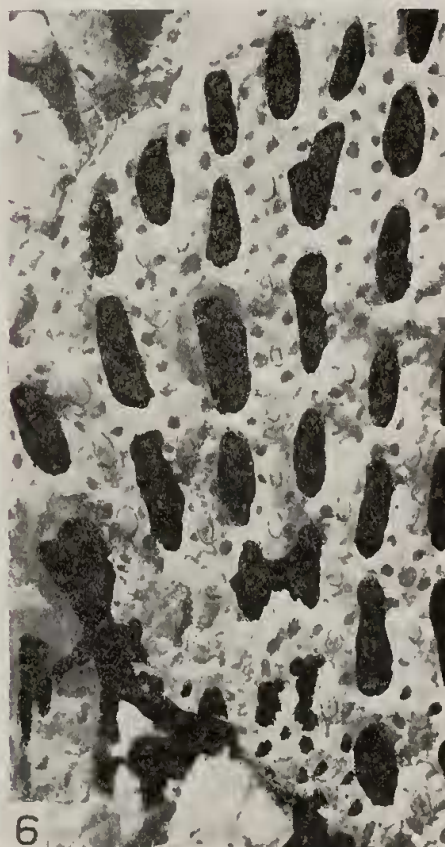
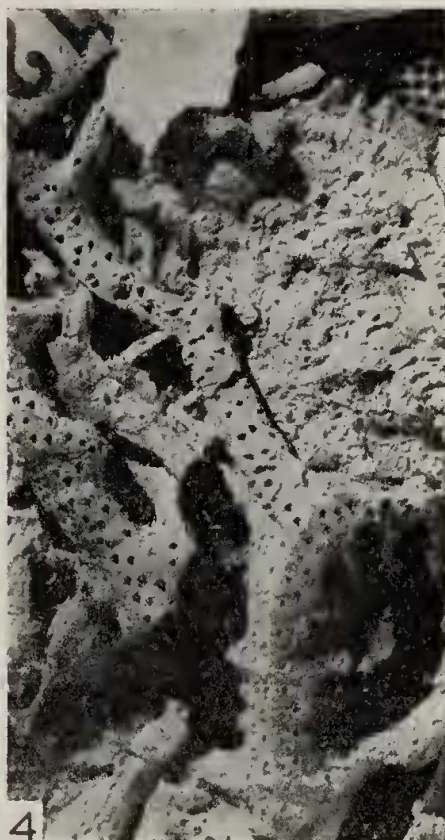
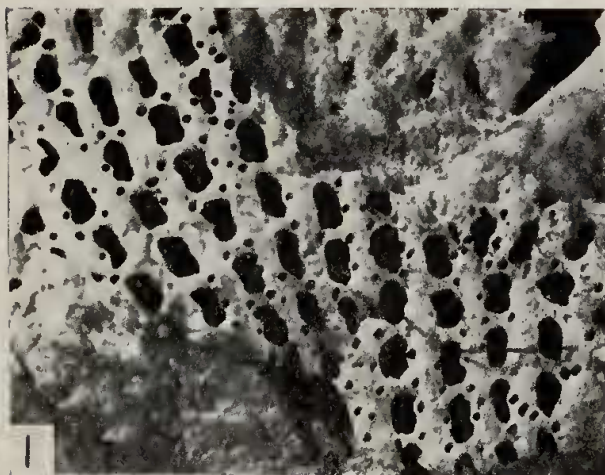


PLATE II.

Figure A. *Fenestrellina horologia* (Bretnall): Celluliferous surface of a topotype, x 20.

Figure B. *Lyropora ekosoides* (Etheridge): A thin section of the part of the lectotype, x 20. (Slide 6277, Western Australian Geological Survey Collection.)

Figure C. *Ramipora ambrosoides* (Bretnall): Longitudinal section, cut loose to the reverse surface (Slide 2793g, University of Western Australia Collection, from a specimen from the Nooncanbah Series 6½ miles north of Mt. Anderson, West Kimberley District), x 20.

Figure D. *Ramipora ambrosoides* (Bretnall): Longitudinal section of a topotype, cut rather closer to the obverse surface than C. (Slide 6278, Western Australian Geological Survey Collection), x 20.

Figure E, F. *Ramipora ambrosoides* (Bretnall): Vertical sections (Slides 2793 e, f. University of Western Australia Collection, from specimens from the Nooncanbah Series 6½ miles north of Mt. Anderson, West Kimberley District), x 20.

(*Camera lucida* diagrams.)

